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ABSTRACT

This document defines and describes electronic databases and provides guidance for organizing a useful database and for selecting hardware and software. Alternatives such as using larger machines are discussed, as are the computer skills necessary to use an electronic database and the use of the computer in the classroom. Files, records, and fields, and three specific database programs are reviewed: dBase II, pfs (Personal Filing System), and DIALOG. The guide to dBase II includes instructions for: getting started, using the manual, help, designing a file, entering data, changing the data, looking at the data, more searching, indexing, creating a report form, printing a report, and changing the structure of a file. The guide to pfs describes versions for the Apple II microcomputer and covers getting started, the function menu, creating a file, adding a form, copying a file, searching, printing, removing unwanted forms, printing reports, predefining reports, and changing headings. For DIALOG, the report includes a reproduction from the introductory manual to the DIALOG system listing databases and their file numbers. (Author/LMM)

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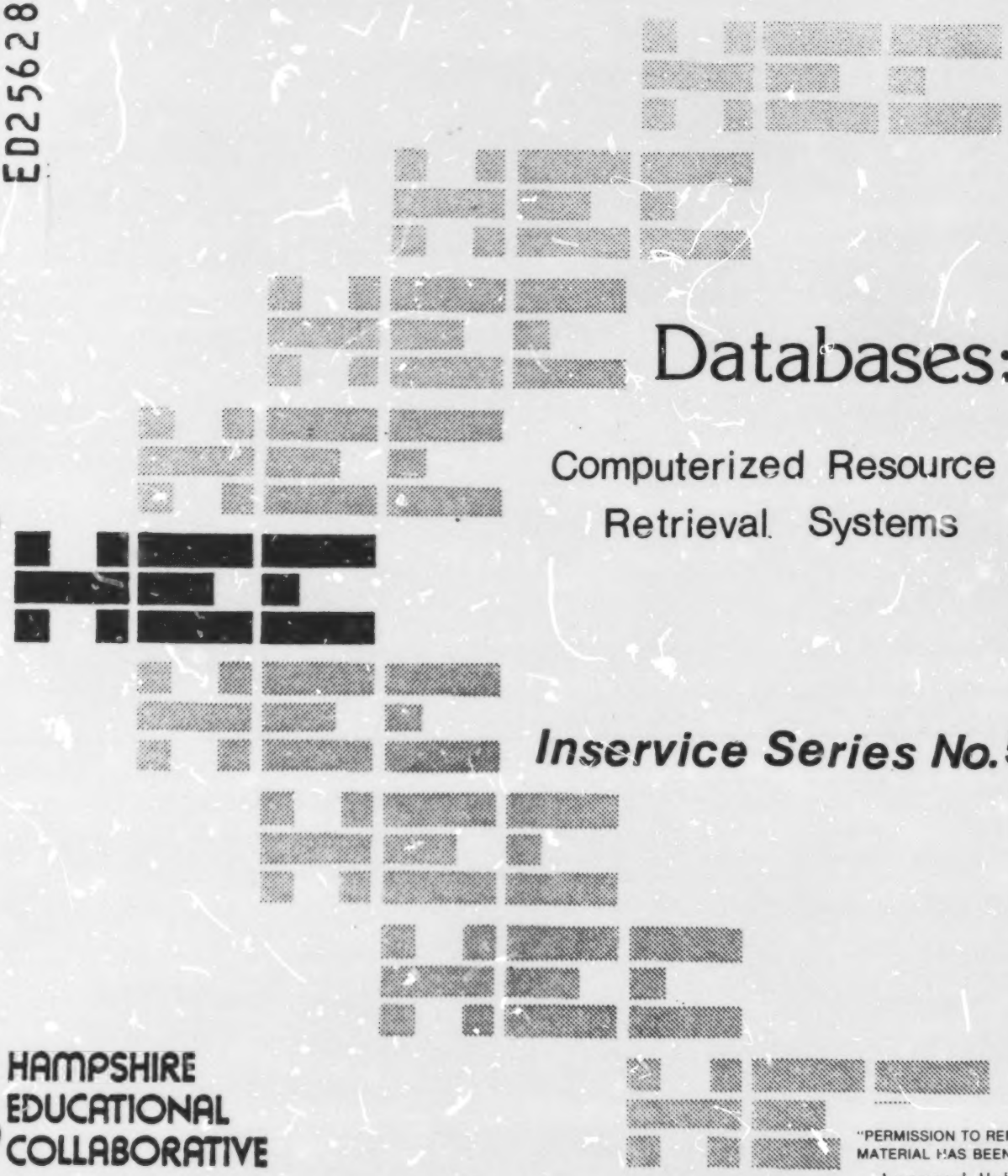

Databases:

Computerized Resource Retrieval Systems

Inservice Series No.5

IR011563

HAMPSHIRE EDUCATIONAL COLLABORATIVE

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HEC activities are concentrated in three program areas:

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- vocational skill training shops
- youth employment project

Special Education

- classes for special needs students
- specialist services
- technical assistance for local school districts
- extra-curricular opportunities for special needs students

Staff Development

- resource center activities (seminars, library, recycle materials)
- curriculum development (basic skills, computers, energy, nutrition)
- technical assistance to school system inservice planning teams
- staff development workshops and courses for teachers and administrators
- microcomputer resource center

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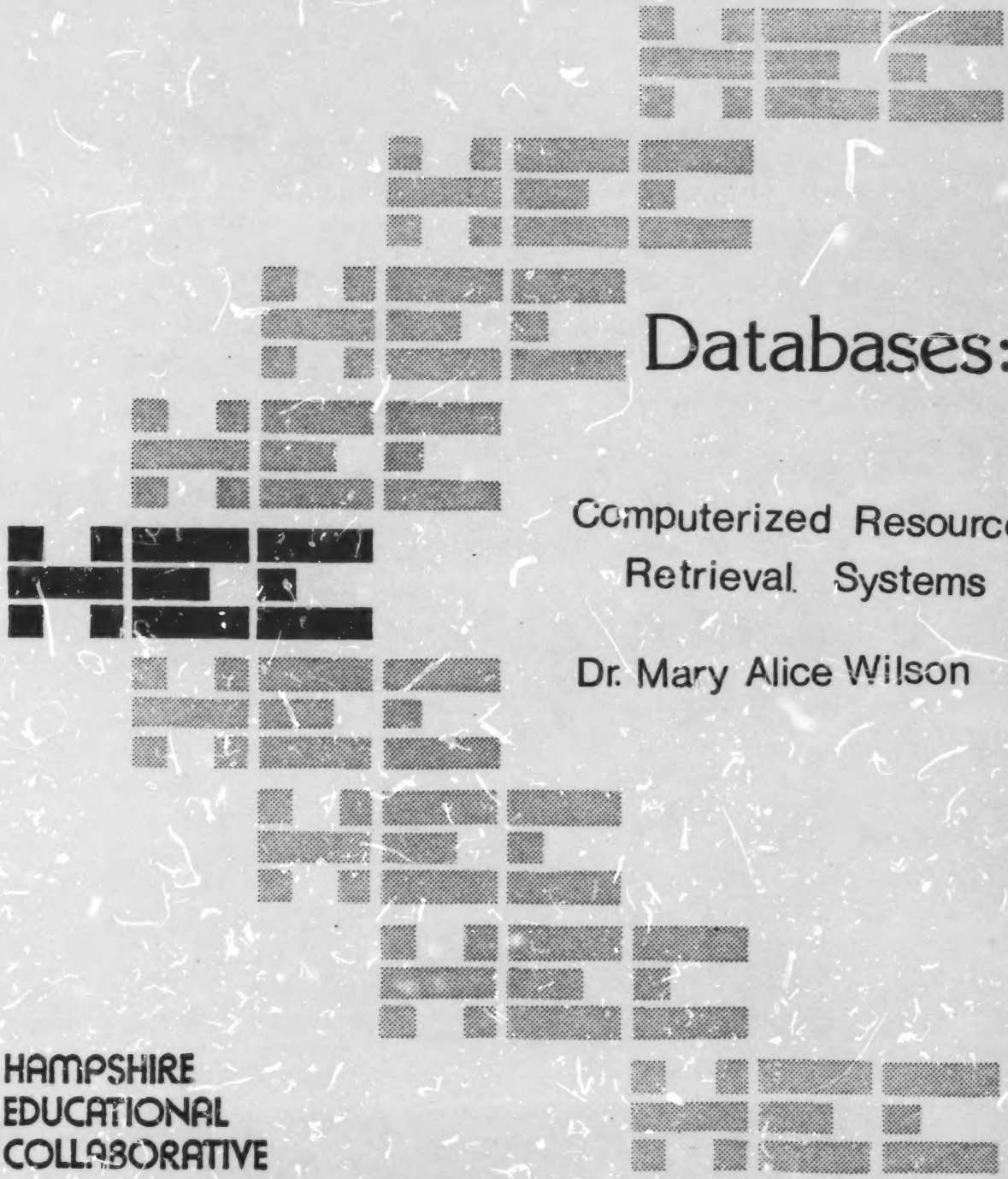

Databases:

Computerized Resource Retrieval Systems

Dr. Mary Alice Wilson

HAMPSHIRE
EDUCATIONAL
COLLABORATIVE

ACKNOWLEDGEMENTS

Warning to the user: Databases are addictive. The user develops the sensation of knowing what is going on and of beginning to ask intelligent, creative questions. May be habit forming.

My special thanks to Dr. G. Ernest Anderson, Richard Horlick, Hy Edelstein and Sandy Massimino for their patience in teaching me the value and problems of database management.

lsew

WHAT IS A DATABASE?

A database is really nothing more than a computerized filing system. It has a FILE (for example: Personnel) which is made up of individual RECORDS (each employee). Each record has a number of entries, or FIELDS, (first name, last name, address, social security number, etc.). The file user(s) can sort the information in a variety of ways for a variety of purposes (alphabetic list of personnel, print-out for W-2 forms, paycheck, telephone listing of employees by department,etc.)

All of us have had personal experiences with databases. In fact, each one of us is a member of many different databases: at the bank, at the doctor's office, at the Registry of Motor Vehicles, at the IRS, at the office of every cause, good and bad, which wants our assistance. Sometimes we feel like Picassoesque figures with each plane, each geometric shape, a database. One of the many books on business applications of databases calls data a business resource on par with capital and labor. How does it feel to walk around being national resource?

The simplest form of a database is probably a mailing list. You might be responsible for keeping track of the current addresses for 100 people. If the only changes you ever need to make in that list is the updating of addresses, a card file is the perfect database. However, you might want to send letters to all 100 people. If such mailings occur only occasionally, hand written envelopes are fine, or you could type labels onto label masters which are then photocopied.

Problems arise when you need the list alphabetized by last name for one purpose, sorted by zipcode for mailing AND someone wants a list of only those people who fall into some specific category: three lists, with more to come. If you had that address list, along with a few discriptors for each person, on a computerized database, t you could produce each list as required. (You could also update the addresses, which was your original goal.) Easier said than done - but not impossible.

The first step in developing a computerized database is to decide what information you want about each person: first name, last name, street address, town, state, zip, phone and those

descriptors (membership renewal date, job title, sales contact, contract number and value, whatever). When you need a list for renewal notices you search for those with next month's date and print out a mailing list (using only name through zipcode in the print-out). When someone wants a list sorted by contract amount, zap.

ORGANIZING A USEFUL DATABASE

Selecting the appropriate database system (software or program) and designing the categories you plan to use for the database are so intertwined that it is difficult to decide which to discuss first. However, both hardware (the computers) and software (the programs) are changing so fast, that you might as well begin assuming that when you are ready to select a database one will be available that will meet your needs. So we will start with looking at what you need to do before you turn on the computer.

Entering information into a database is time consuming, very time consuming. Therefore, you want to start with as much careful planning as possible. There are (at least) two dangers. On the frying pan side, you may unnecessarily limit the size and purpose of your database so that you will end up having to have 3 databases to do the job that should be done by one. The fire, of course, is that you will design such a huge database that you will run out of storage space on the microcomputer and it will take all day to sort the files. You need a database that will be flexible enough to meet your changing needs and small enough to be manageable.

Unless you work entirely alone, you also need a database that meets the needs of others with whom, and for whom, you work.

Great, more meetings. You will probably get more information from people if you go to them with a rough plan, get their ideas, come back with a fairly complete draft and get their ideas again. Given the perversity of human nature, their best ideas will come one week after the data is all entered, when at least three people will have brilliant ideas that really would have been useful 3 months earlier. If fact, of course, until we see something actually working, most of us have difficulty thinking of how an innovation can help us. Therefore, you might want to think about taking on a small project for your first database so that you, and your colleagues, can learn from the experience.

Don't get discouraged when the reactions to your first demonstration are comments on typographical errors, the small

size of the database, the incredible amount of time it took to enter the data compared with using the already excellent filing system, and a totally different approach that would have worked much better. Write all those ideas down for the next design. Some of them may actually be helpful. A month from now your loudest detractor will come to you with the most exciting, innovative idea: what about taking all the information we use for .... (you fill in the blank) and putting it on the computer! Keep smiling, you have just achieved "ownership of the innovation by the user."

If you are fortunate enough to be able to turn over the entry of data to others, be sure that they keep a log of problems and suggestions as they do the data entry work. If the program you are using makes it difficult to enter information into the database (either because the directions are ambiguous, corrections time consuming, or data easily destroyed), that program is a failure. Only those who have spent hours entering data which was then stored on top of previous data, or lost completely, or lost randomly realize how important it is to have a good, entry-friendly program.

A good database should:

1. Meet immediate needs.
2. Encourage users to think of additional uses.
3. Make it easy to enter, correct and update information.
4. Work easily within the limitations of the available computer. (More about that later.)

Caution: If you only have to update information, not sort it in different ways, you probably need a word processing program, not a database.

Second Caution: If you only have temporary or intermittent use of a microcomputer, play with the computer, try building a few bogus databases, but don't try any serious work. A computerized database which is updated, accurate and accessible is a wonderful tool. A database which you can't use whenever you need it is total waste of time (unless you are a psychologist interested in studying stress.)

To summarize

1. Define what you want to do: what problem do you have that a computerized database system would help you solve?

2. Analyze the requirements of the system: what does it need to be able to do for you and for others?

3. Design a system: what would it look like if you were going to store the information on cards, manually sort them and compile the information into a report?

4. Try it out with a database program : put in a small amount of useable data so that the test is real, but the work of entry has not be backbreaking.

5. Review and evaluate: ask everyone involved with entry and use what changes should be made? Are there 4 databases where there should be one? How many people (bookkeeper, quarterly report producer, client contact person, need similar information? How many people have similar mailing lists?

6. Document: make sure that those entering data, and those using it know exactly how to do it. If they get frustrated by poor training all that work will have been wasted. There must be a home somewhere with big shady trees for unused databases.

7. Supervise: someone must be responsible for regular (every Thursday morning from 10 to 11) updating of the files. Users must be responsible for keeping a log of use and problems, but should not be asked (or allowed) to make changes. A little imagination should help you see why you don't want someone who thinks the client has moved changing the address! Finally, someone must be responsible for weekly reviews of entry and user logs and monthly reviews of the system. (And have the authority, or the access to the authority, to make changes.)

HARDWARE/SOFTWARE ISSUES

Every microcomputer with a reasonable sized memory (48K or better) has at least one database system for sale. Five years ago we began our experience in databases by having programmers write programs specific to our needs. No more. There are too many good databases on the market. They may be expensive, but paying programmers by the hour is, I assure you, more expensive.

Most of my experience has been with Apple IIs. However, there are many other microcomputers with excellent programs. If you do not already own a microcomputer and need to select both the computer (hardware) and the program (software), or if you are only selecting the program, then consider using all of these sources before you make your decisions:

1. computer magazines (reviews, advertisements)
2. computer shows/conferences (workshops, displays)
3. local computer club (find out who is doing what)
4. local computer stores (try them)
5. organizations, businesses near you that use microcomputers in their work (talk to managers, users, observe)
6. workshops or courses offered through extension, community colleges or adult education centers.
7. bookshops (treat them as libraries to look through the latest books on computer uses); libraries (look only at books published in the past 2 years, others will be out-of-date, incredible isn't it?)

Service: Computers break down. The only way to anticipate this is to believe in Murphy's Law. When you are talking to computer stores and to other users be sure to check on both stated service and actual practice. Most service contracts are 10% of the value. You may be able to save money by paying for service as you go, but put aside the money; don't spend it on software. You will always need service. You will need more in the second year, etc. The microcomputer may not have moveable parts, but the disk drive does and it breaks with depressing regularity. (We probably have a higher repair need than most groups because we train so many new computer users on our nine Apple IIs. With the best care we can provide (no smoking or food, as little dust as we can manage) we have to repair an average of one disk drive a week (average cost $35.)

ALTERNATIVES: LARGER MACHINES, SHARING DATABASES

Keep in mind that you may be asking the microcomputer to do more than it can do. If you find yourself talking about networking four computers, adding extra memory and mag wheels, maybe you really need a minicomputer or a terminal attached to a mainframe (the big guys). Maybe there are three or four other groups out there with the same needs and you could share one system.

Caution: Don't get caught in the game of thinking that you can put your database up on any computer, micro or mini or mainframe, to which you do not have immediate and continuous access. Schools sometimes think that they can let the students use the computers during the day and that the office can use them "some other time." No way. If you are asked to produce information on the educational plan for a specific student for a 10 AM meeting, you need access to the computer now, not after working hours. The better your database, the more you will be using it, the more important it is to have the information readily available. Either the microcomputer itself, or a terminal to a larger computer, should be comfortably available to whoever is responsible for using it all day long.

Second Caution: Before you design a database, make sure it doesn't already exist. In a recent national magazine, a business executive explained how he used his microcomputer to catalog his National Geographic collection. National Geographic publishes an excellent index! Check with those who will be using the database with you to see if another exists. Before you even consider putting any reference materials, abstracts, etc. on the computer, consider joining one of the databanks (multiple database systems) available.

FILES, RECORDS AND FIELDS

Let's look at an example of a database containing a single File (in this case a mailing list). The file has RECORDS (one for each person). Each record has a number of categories (or FIELDS.) These field might be:

First Name:

Last Name:

Street:

Town:

State:

Zipcode:

Telephone:

Renewal date:

Salesperson:

Contract $:

Comments:

Last name is usually a separate field so that you can alphabetize. Most databases with which I am familiar allow you to select and print only those fields you need for a specific purpose. (You don't want the Comments printed on a mailing label!)

Whenever it is possible, it is nice to save storage (memory) space in the computer by coding entries. In the list above, the salespeople could be coded, so that you could use 2 or three digits or characters instead of the 10-15 spaces for a last name.

WHAT COMPUTER SKILLS DO I NEED?

Many instructors (and all computer salespeople) will tell you that two hours of training and a few toll free phone calls will be all you need. Not true. If you have never used a computer before, a database is as good a place to start as any, but you can't stop there. You need to understand the jargon (if you don't believe me flip through a few manuals); you need to know what is happening; you need to make wise decisions about alterative uses of the computer.

I recommend that you learn, at the introductory level, some language. We usually start people on LOGO because we love it for it's problem-solving, interactive approach. You will need to know something about BASIC because the BASIC commands are the jargon of the manuals. Many people find learning some PASCAL to be very helpful. Whatever you pick, you don't need to plan to be a programmer, but you should be able to write a simple, successful program. (Using the car analogy, you don't need to be a mechanic to be a good driver. However, you do need to understand the basic functioning of the internal combustion engine, to be able to identify the major parts of the car and to be able to distinguish the difference in the sounds of serious and trivial problems.)

USING A DATABASE IN THE CLASSROOM

There are a variety of ways to use databases in the classroom. The developers of Notebook, a database described later in the manual, tell about an elementary teacher who developed a memo format for students to write messages to each other and to her,

Almost all social studies and science courses encourage the development and manipulation of data. You can spend hours designing and entering databases for your students, or you can turn that job over to them. Not because you are lazy, but because you realize that the real learning comes in that designing and entering process. If you are interested in (a) encouraging problem solving skills and (b) the active use of the computer as a tool of the problem solver (which, of course, is what it is), try letting students (whole class, small groups, or individuals) develop databases themselves.

INTRODUCTION TO dBASE

Mary Alice Wilson

Hampshire Educational Collaborative

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dBASE

dbase is a "relational database." Sounds impressive. The purpose of using a database is to create a file (a large number) of individual records (people, books, widgets) which can then be listed, sorted or searched in different ways.

I. GETTING STARTED

To load dbase (remembering that disks go in with the label side up and at the front)

a. if you are using a computer that you turn on before putting in the disk, do it that way

b. if you are using a computer that asks you to put the disk in first, do it that way

c. you will need a file disk later, use the standard initializing or formatting program on your system master to create such a disk if you don't have one.

d. if you have a second disk drive, put the file disk in the second drive (referred to in this program as drive b:)

When the disk drive light goes out, You will be asked to type in the date, either do so or press Return.

If you have successfully loaded dbase, you will have a . for a prompt. If you do not, start again.

If you are using two disk drives, put the file disk in drive B and type:

set default to b:

II. USING THE MANUAL

The manual is very helpful. The front part is mostly English, the back part is not, but can be a useful reference. There is an index at the back and an explanation of the "typography" at the front. Get used to looking things up in it.

III. HELP/I WANT OUT

to stop a command ESC (press the escape key)

To leave dbase, return to the . prompt, type QUIT. (It is really important to leave dbase via the "quit" since you

may loose information by just turning off the computer, or hitting the Reset key.)

IV. DESIGNING A FILE

type CREATE filename

The filename can be up to 8 letters, (no spaces), it will appear in the directory as filename.dbf Think of something that will make sense to you later.

a FILE is a bunch of records

each RECORD is one person/book/widget

each record has a number of FIELDS (name, address, salary)

A field name can be up to 10 characters, no spaces, use enough letters to make meaning clear

Data types are

C character (alphabet or numbers which are not to be added, subtracted etc. like social security numbers)

N numeric, numbers to be added, subtracted etc. When figuring the size, remember that, if you want decimal places, you need to count a space for the decimal point.

When you are finished creating a database, press Return, and Return again.

If you want to make some changes, now is a good time to do it. Type:

MODIFY STRUCTURE

You will be told that the data is going to be lost, that is no problem since you don't have any data. (If you do have data, see section XII.) To make changes, you can use:

Return key to move down the screen

CTRL/E to move up the screes

CTRL/N to insert a line

CTRL/T to delete a line

(you can type over any line)

When you are finished, press CTRL/W to save your work

V. ENTERING DATA

If you are not already using dbase, load dbase (see I)

type USE filename (i.e. whatever name you gave your file)

type APPEND and you will find yourself facing a empty record.

Use the Return key to move down the fields

To edit upwards, use CTRL/E

At the end of each Record, type CTRL/R to record the new record on the disk. If the last field is full, the computer will automatically go to the next record.

When you are finished, press CTRL/R to get to a clean record and then CTRL/W to "write" the record on the disk (until this command, none of the records have been saved!

It is important to verify the work you have done, use an appropriate list command (section VII) to check the data.

It is easier to check a paper version of the data, turn on the printer, make sure the paper is feeding properly and type

SET PRINT ON

and then, on the next line, the list commands. When you are through type: SET PRINT OFF. If you have made mistakes (most of us do), use the EDIT command (next section.)

VI. CHANGING DATA

If you are not in dbase, load dbase (see I), type USE filename

type EDIT (and then the number of the record you want to change)

to move forward through records	CTRL/C	(continue)
to move backwards through records	CTRL/R	(reverse)
to add characters	CTRL/V	
to delete characters	CTRL/G	
to delete the record on the screen	CTRL/U	

delete puts the word "delete" on the record and shows it on any listing with an asterisk. You can "undelete" with another CTRL/U. To get rid of a record permanently, see the manual index for PACK.

When you have finished making changes (or at least every 15 minutes) press CTRL/W (if you don't use that, changes will not be saved.)

VII. LOOKING AT THE DATA

There are a number of similar commands (list, display, find, locate). The command "list" seems to do everything that the others do, so for a while, stick to "list."

If you are not in dbase, load dbase (section I) the type USE filename

LIST STRUCTURE — will produce the way the file is designed (field length, type of data, field name)

LIST FILES — will produce the full list of files. If you are using two disk drives (have SET DEFAULT TO B:), you will get the files on the B drive. This will only list .dbf files, to get a listing of all files, including indices and reportforms, use the asterisk (wild card), type

LIST FILES LIKE *.*

LIST — will list all the data (stop the scroll with CTRL/S (scroll) You can use DISPLAY instead and get only 15 on the screen at a time.

LIST NAME,PHONE — will list the record number and the fields called "name" and "phone"

LIST OFF — will list without giving the record number (something you rarely want to see)

LIST OFF NAME, PHONE FOR NAME = "GEORGE"
will list every record that has the word george anywhere within the field "name"

LIST OFF NAME, PHONE FOR "JFK" $ SCHOOL
will list the name and phone for those records which have JFK in the list of schools (technically called a substring search)

LIST OFF NAME, SCHOOL FOR HIREDATE > 800901
will list the name and school for those records which have a hiredate of later than 80/09/01 (September 1, 1980)

VIII. MORE SEARCHING

When you are listing, you can use the following types of arguments

1. arithmetic	() * / + -	i.e. work inside the parenthesis, multiplication, division, addition, subtraction
2. relational	< > = <> <= >=	i.e. less than, greater than, equal to, not equal to, less than or equal to, greater than or equal to
3. logical	() .NOT. .AND. .OR. $	i.e. inside the parenthesis, something but not something else, something and something else, something or something else, search for letters embedded in a word (substring.)

As scary as these may seem, there really are an easy way to find everyone who lives in a certain town, has a certain zip code, everything with a price greater than, or in a certain category.

IX. INDEXING

An index is a neat way of sorting information alphabetically or numerically. Rather than sort the entire database, which is very time consuming, dbase allows the user to create indices. For example, you might want a personnel database indexed by last names for telephone list, by zip code for mailing, etc.

If you are not in dbase, load dbase (Section I) type USE filename.

INDEX ON fieldname to INDEXNAME

(the indexname can have up to 8 letters, no spaces, and will appear in the directory as indexname.ndx)

Once you have created an index, you use it by typing

USE filename INDEX indexname

Remember that you need to re-index after you have entered new records.

Most dbase users have at least 3 indices for a database.

X. CREATING A REPORT FORM

Report forms provide handy ways to look at information of the screen or on paper.

If you are not in dbase, load dbase, type USE filename (if you want to use an index, add that)

To create a report form, type REPORT

You will be prompted to put in headings, describe fields and decide if you want counts and/or totals (you can count anythirg, you can only total numeric fields.)

Later you can use this report (which will appear in the directory as reportname.frm) either to print out every record, or to select records for printing:

REPORT FORM formname (will print out all records)

REPORT FORM fornname FOR POSITION = "TEACHER"
(will print out a report with only those records in which the fieldname "position" is listed as teacher

XI. PRINTING A LIST OR REPORT

You can print anything out using either

CTRL/P or
SET PRINT ON

Before you use these commands, make sure the printer is on, the paper properly aligned and the "on line2 light (or similar light) is on.

If you use the commands before LIST.... or REPORT FORM .... you will get your information printed on paper (hardcopy).

There are other ways to use the dbase file by writing a Command File to print out a special format or by moving part of all of the file into a word processing program. These may well be worth the effort for major printing projects.

XII. CHANGING THE STRUCTURE OF A FILE

If is possible to change the design of a file (add fields, delete fields, change field lengths.) However, it is messy because if you just jump in and make changes you will loose all the data you have typed in.

1. make a back-up copy of your file and put away. (Use the FID command on the DOS System Master)

2. Load dbase (see Section I)

3. type USE filename

4. type COPY filename TO TEMP

5. type USE TEMP

6. type MODIFY STRUCTURE (you are now working in the temporary file, your original should be save (even if it isn't you have made that extra copy just to be safe.) Make the changes you want.
7. Complete those changes with CTRL/W

8. type APPEND FROM oldfilename (that moves the old data into the new format)

9. type COPY TO oldfilename

10. to check it out type USE oldfilename, and either the EDIT or LIST command to look at the data

(If you have shortened a field length and any data is longer than the field length, you can expect trouble. Remember, there is always that nice clean copy you made at the beginning!)

pfs (The Personal Filing System)

pfs File and pfs Report

This database is available for a number of computers. The description here applies to using pfs on an Apple II. There are two versions of pfs File for the Apple II (and another for the IIe) wandering around. This manual will describe both of the versions for the Apple II. The main differences in the IIe version is use of directional arrows for moving the cursor on the screen; use of lower case characters, and a bug-free version of re-designing the file.

Requirements: If you had two disk drives, copying files will be easier. In fact you MUST have two disk drives to copy the structure of a file. You must also have two disk drives if you want to sort your data. Since it is difficult to imagine using a database in which sorting is not essential, if you do not have two disk drives you may want to use a different database. There are additional pfs programs which enhance the capabilities of the original programs: Graph (II and IIe versions are different) and Write (available on Apple only for the IIe.) They will not be described here. Although you don't need a printer to understand the purpose of the program, you probably cannot take full advantage of the power of any database if you don't have a printer.

Getting started: Load the pfs File disk into the Apple.

a. Put the disk in the disk drive label-side up and in front, if you have two disk drives, put the disk in the drive labeled "#1."

b. Close the disk drive door.

c. Turn on the computer; turn on the monitor. There will be some scraping noises, DO NOT OPEN the disk drive door until the light goes out and writing appears on the screen.

d. If nothing is happening, check all electrical connections. Go through the procedure again. If nothing happens, go for help.

Put the pfs File DISK AWAY. (You won't need it during the use of the program and putting it away protects it from damage.)

You should be facing a screen which looks like this:

```
.....................................................................
                        PFS FUNCTION MENU

   1  CREATE FILE                    4  SEARCH

   2  ADD FORM                       5  PRINT

   3  COPY FILE                      6  REMOVE

         SELECTION NUMBER:

         FILE NAME:
.....................................................................
```

Whenever you want to get back to this screen, press ESC

To move between selection number and file name use the right hand arrow -->

To erase, use the left hand arrow, then type over or eliminate with the space bar <--

After you have made your choices, press CTRL/C to continue

1. CREATE FILE

From the main menu, type "1", press the right hand arrow. BEFORE YOU TYPE IN THE NAME, PUT A NEW DISK IN DRIVE #1. (Any previous pfs information will be removed from this disk, so be careful which disk you use. See hints at the end of the pfs File section for ways of labeling your disk.) NOW invent a file name that you can remember (no more than 8 characters) and type it in.

You will be given a chance to undo your command. Assuming you want to go ahead, press CTRL/C.

You are now facing a screen with status line at the bottom saying:

FILE (YOUR FILE NAME) DESIGN PAGE 1

You are ready to create a format for your file.

Each ITEM (called a FIELD in some other databases) needs a name; each name must be followed by a colon. Names can be put any place on the screen. In deciding how much space to leave for each item, you need to know that the field needs to be two spaces longer than the longest entry (for sorting purposes later). Even if you are not going to sort on a certain field, leave at least

one extra space to make entering the data easier. If you are worried about leaving too much space and filling the disk's memory with blanks, pfs shortens trailing spaces to 3 spaces (3 bytes).

If you should forget to end an item with a colon, when you save your design you will find that item will be merged by a long "light box" to the next item. If, after you finish you design, if you find such a long light box, you have forgotten a colon. Redo your design.

When planning the sequence of your items, it is important to realize that pfs is designed to sort fastest on the first item. Therefore, select the most likely item to be used in a search and place that item in the upper left-hand corner. You can have more than one item on a line. For simple printing of information from forms, lines can be skipped, but the sequence cannot be changed. (So if you want to print mailing labels, put the information in the order it would appear on a label.)

Size limitation: 50 items per screen (or page)
32 pages per form
1000 forms per file (although, the longer the form, the less forms will fit. To calculate the exact amount see Appendix C in the pfs manual)
1 file per disk

When designing a file (or when adding a form), you have the following editing keys available to you:

CTRL/T	moves the cursor up a line
CTRL/V	moves the cursor down a line
CTRL/G	moves the cursor one character to the right
CTRL/F	moves the cursor one character to the left

(notice that these four keys form a directional cross on the keyboard)

CTRL/N	moves the cursor to the next page of the same form
CTRL/P	moves the cursor to the previous page of the same form
<--	moves the cursor back to erase, type over or use the space bar to erase
CTRL/E	erases the page (everything on the screen)
ESC	returns to the main menu, work WILL NOT BE SAVED
CTRL/C	SAVES DESIGN, returns to main menu

Designing a form that will really meet your needs is time consuming. You should anticipate trying at least 3 versions before you find one that best meets your needs. Therefore, start with a fairly simple format in order to test the capability of the program. For testing purposes, put in about 6 fields. Even if some of the items are forced, include the following types of items:

a code number (like personel number or inventory number or social security number

a real number: price, value, a measurement, something that makes sense to add, multiply or average.

a date: using the format ##/##/## using the order: year/month/date)

a name: of the product, person, or book

a text section which is used for description (this will be a little difficult to do if you are creating a database for an inventory, try to put in 2 lines of text to understand what can be done with it)

put at least one item on the second page (use CTRL/N o get there and CTRL/P to get back) so that you can test the use of a multi-page form.

If you put numbers in with a dollar sign, or commas, pfs will ignore those when doing calculations. If pfs finds periods in a number it will take the first period as a decimal point and ignore the others (11.22.33=11.2233 for calculating purposes.) Minus signs at the begining or end of a number are treated as minus signs, others are ignored (11-22-33=112233 for calculations.) Even if pfs is forgiving about commas and dollar signs, it is good practice to plan to be consistent. If you are going to use a date, sorting will be much easier if you use the 83/10/21 format where the year is first. For this first trial, don't spend too much time, just put in a variety of types of items so you can teach yourself the power of pfs.

When you have enough fields entered to test the program, press CTRL/C. Your design has now been entered on the disk.
On the newer version of pfs there is a way to change the design of the file if you want to. Unfortunately it seems to have a bug in the command which keeps it from turning off properly. If you use this command check the "Helpful Hints #2" section at the end of the pfs file section to stop the processing. The Apple IIe version has solved this problem.

2. ADD FORM

From the main menu, select #2, give the name of the file you have designed, press CTRL/C. You are now ready to put information in your file. MAKE SURE THAT YOUR FILE DISK IS IN THE DISK DRIVE and that the door to the drive is closed.

The template (empty form) should be on the screen, if it is not, re-read the directions. Assuming the template is on the screen, enter you first FORM (called a RECORD in some other databases.) You have the same cursor movement commands that were available in DESIGN (the T,F,V,G cross; the left-hand arrow; the CTRL/N and P to move between pages.) You also have the right hand arrow --> to move easily from item to item.

When you finish a form, press CTRL/C so that it will be saved and a fresh template will be available for you. Enter about 5 records so that you will be able to test the power of pfs. For testing purposes, enter two forms that have the same name, but some differences in other items. To return to the main menu, complete your final form, press CTRL/C and then, when a new blank form is on the screen, press ESC. If you press ESC while you are entering, the form you are working on WILL NOT BE SAVED.

You can always add more forms. Stop after a five to try out the other commands and to see if your design really does what you want it to do.

3. COPY FILE

Everything you will ever read about using a microcomputer mentions the importance of back-up copies. If you don't make backup copies you are asking for disaster. (Or you don't value your own time.)

If you have a double disk drive:

As was mentioned earlier, there are two Apple II versions of pfs on the market, the copying directions are dramatically different.

1. Select #3 and follow the directions on the screen EXACTLY. Back-up disks are traditionally named the same first 6 letters followed by "bk" for backup.

2. When you have completed the entire process, remove the new disk, label it (with a felt tipped pen) and store in a non-magnetic, clean place that is separate from the working copy.

8. Repeat this procedure (either rotating two copy disks, or using the same one) EVERY TIME YOU ADD OR MAKE CHANGES IN THE INFORMATION IN THE FILE.

If you have one disk drive.

1. Leave pfs by turning off the computer.

2. Put the DOS System master in the disk drive, turn the computer back on.

3. Type RUN COPYA

4. You will be asked the following information

ORIGINAL SLOT	6	(press RETURN)
ORIGINAL DRIVE	1	(press RETURN)
DESTINATION SLOT	6	(press RETURN)
DESTINATION DRIVE	2	(type 1)

5. Put the pfs file disk (the one you have your data on) in the drive, close the door. press RETURN

6. When asked to put the DESTINATION DISK in, take out the file disk, put it to the right of the computer, put the new (or to-be-recycled) disk in the drive. As you continue to follow the directions, keep the original on the right and the new on the left (or you may become hopelessley confused.)

7. Take out the copied disk, label it (with a felt tip pen) and store in a clean, non-magnetic, separate place.

8. Make a new copy (either rotating two copy disks, or using the same one) EVERY TIME YOU MAKE CHANGES IN THE FILE.

4. SEARCH

Again, being sure your file is in the disk drive, type #4 and the file name, then press CTRL/C.

An empty form (template) should be on the screen. Using the right hand arrow --> move to the item you want to use in your search. The following choices are available to you:

a. whole field search — type in the entire item you are looking for. For example, if you had a 3 letter code, type in the 3 letters you want.

b. partial field search often used for longer items, .. means to ignore characters. If you are looking for the word "manual" in a long description, type ..manual.. In other databases "word..2 might be called a string, or sub-string search

..word

word..

..word..

c. numeric search — used where greater than >, less than <, or equal to = can be used to sort information.

d. a combination — There is a limit to how many conditions can be met in one search, if you exceed that limit, pfs will tell you. However, you can easily search for conditions in two or three items at once. Just put the right information in the appropriate item boxes (this is why you left the blank spaces in each item so that there would be room for the .. or the >.

(If you have the newer version of pfs you have the additional commands available to you. For the older version people, you will find them available to you on the pfs Report disk.)

e. numeric range — =33..49 selects all numbers from 33 to 49 inclusive. Be sure to include the equal sign (=), or the search won't find anything.

f. missing characher @ can be used to accept any character in that position. 83/11/@@ will take all dates in November 1983. Since the computer is looking for 2 characters, make sure that November second is entered 83/11/02 not 83/11/2.

g.not meeting specification /=350 will exclude all forms where the value in that item is not 350 (and include all others). /MA will remove all Massachusetts addresses from the selection. /=22..33 will elimate everything from 22 to 33, etc.

When you have completed the description of the conditions of the search, press CTRL/C. A form which meets your conditions will appear on the screen. Notice that it is the last form you entered which meets the condition, pfs sorts backwards through the file. If your form uses two pages, use CTRL/N AND CTRL/P to move between the pages. Press CTRL/C to get additional forms. (If you had wanted to look at all the forms, you would just have pressed CTRL/C when asked for Retrieve specifications.)

You now have the options of making any changes in the form

Move your cursor around as usual, retype and when you are finished, press CTRL/C. Be sure to use CTRL/C (which will save your work rather than ESC which will return you to the main menu without saving the last form. (By the way, many databases do not offer such easy access to changing data. You need to think about the security implications of having the SEARCH and EDIT commands combined.)

You can print out the entire file, press CTRL/O (O=output)

If you decide to print, make sure the printer is connected, the paper feeding properly, the on-line (or comparable) light is on. If the printer is not advancing between lines, press ESC to stop the process. You will need to tell the program that you want a line feed given to the printer. In the older form of the program, press CTRL/L before selecting PRINT. In the newer version, select L instead of P for PRINT FORMAT.

This "dumping" (printing out an entire form) is sometimes useful, but you may want to use the commands available from the PRINT selection on the main menu for more selective printing.

5. PRINT

Note: You will need to learn both the PRINT command in this program and the pfs REPORT system since the commands produce rather different formats. REPORT puts all the information from one form on a single line (not a big help for a mailing label.)

a. Making sure your disk is in the drive, that the printer is on, and the paper feeding properly, type #5 and the file name, then press CTRL/C. Your first experience with PRINT may be a disaster, as your printer may need a line feed command (see previous page.) However, if your printer doesn't need it and you give the line feed command, everything will be double spaced. The Epson needs a line feed.

b. Again you are looking at a blank form. At the bottom on the screen is

FILE (YOUR FILE NAME) RETRIEVE SPEC PAGE 1

If you do not want every form printed out, you need to use the same procedure you used for SEARCH. If you want every form printed out, just type CTRL/C.

c. You are then asked:

PRINT OPTIONS

PRINT ITEM NAMES (Y/N)

LINES PER PAGE 33

(Plus some additional questions on the newer version)

If you select "Y" the labels for each item will be printed out. You might want that for some print formats, but wouldn't want it for mailing labels.

There are 66 lines per page. "33" will put two forms on each pages. For mailing labels you would want about 6.

(With the newer version, ignore the PREDEFINED FORM NAME for now, select P or L depending on your printer, and continue.)

Use the right hand arrow to make these choices, when finished press CTRL/C.

d. Now you are back to a new blank form. This time the status line at the bottom of the screen says

FILE (YOUR NAME) PRINT SPEC PAGE 1

As you use the right hand arrow --> between items, you have three choices:

leave the item blank:	That item will not be printed
x	That item will be printed and the printer will move to the next line.
+	That item will be printed and the printer will stay on the same line.

In the newer version, you have two additional commands:

S	Sorts alphabetically from the left letters will be A to Z numbers will be 0 to 9 (numbers must all the the same length, in this sort 102 comes before 53 which comes before 9!)
T	Treats an entry as text, uses the the full length of the page and wraps words (breaks them only at spaces)

If you give no print specifications, everything will be printed just as it appears on the screen.

If you have more than one page in the form, use CTRL/N to move to the next page.

When you are finished press (you guessed it) CTRL/C.

If something is wrong with the printing, press ESC. If everything is printing on one line, return to the beginning of this section for directions on how to correct the problem.

For those with the newer version of the program, you can also predefine print formats, if you want to change the format later, bring the format you want to change onto the screen, then use CTRL/E to erase the entries, or CTRL/R to remove the format completely.

6. REMOVE

Once again, make sure the file disk is in the disk drive, type #6 and the file name, then press CTRL/C.

The purpose of this command is to remove unwanted forms. If you only want to make changes, you would do that using the SEARCH command. Before you become delete-happy, remember that a form (or record) deleted is lost forever. Electronic heaven. If you are using pfs to keep personnel records, at least make a paper copy (hardcopy) of the entire form (you can use CTRL/O when in SEARCH) before you delete completely. Put the paper copy in the dead storage files. Or you may want to keep archival copies of the disks themselves. Make a copy of the entire disk, put the copy in storage, then delete from the active disk.

Assuming you want to erase the information forever:

You are once again faced with a template. Unless you want to remove every single form, specify which form (or forms) you want to delete. You might want everyone with code numbers less than 100, employee ID # 12543, everyone with the last name of Wilson. Consider for a minute how dangerous that might be!

When you are through making your search selection, press CTRL/C.

You are given one last chance, after you press CTRL/C it's all over. Actually, it isn't quite. If you realize you have made a horrible mistake, press ECS IMMEDIATELY. You will only loose the forms that have flashed onto the screen.

HELPFUL HINT #1:

The catalog of a pfs storage disk cannot be listed in the usual way (loading the DOS system master, putting in the disk, asking for CATALOG.) Nothing is listed. It is, therefore, almost impossible to find out the name of a file if you have forgotten to label the disk. There are two solutions that I know of. Load the pfs Report disk, place the unknown filename disk in drive #1, select #1, leave the filename blank, press CTRL/C. The file in the drive will be loaded and the name will appear on the bottom of the screen. If it isn't the file you want, press ESC, Put in a new disk, type #1, etc. A second technique is to label your disks so that the file names can be read by simply loading them directly into the computer.

For some reason the pfs format design process does not erase any BASIC programs already on the disk. Therefore, you can use the following procedure to put an electonic label on your storage disk.

1. Load the DOS System Master, remove the disk.

2. Put a new (or to-be-recycled) disk in the drive.

3. Type the following

```
NEW

10 PRINT "PFS FILE DISK, FILE NAME:....."

20 PRINT "MY NAME, THE DATE"

30 END
```

(filling in the proper file name, your name and the date)

4. Make sure the program runs by typing, RUN.

5. With the new disk in the disk drive and the door closed, type

```
INIT HELLO
```

(There will be much scrapping and whirring, wait until the light goes out.)

6. Check that the disk works by typing

```
PR#6
```

Label the disk with pfs and the file name, now load the psf File and use this disk to design and add the forms.

Of course, if you later erase the file and use a new name, you will want to change the HELLO program. Just put the file disk in the computer, turn it on. When the light is out, type

```
LOAD HELLO

LIST
```

Write a new line 10 with the new file name, check to make sure it runs, then type

```
SAVE HELLO
```

and the new title will be on the disk.

Helpful Hint #2:

If you follow the Change of Design directions perfectly, you will finally come to a moment when the file has been redesigned, the screen is quiet (showing Form #1) and the computer is an endless loop between drive one and drive two (lights flashing back and forth.)

a. Press RESET, the computer will go to drive #1 and try unsuccessful to read it, light will stay on.

b. Press RESET again, the computer will go to BASIC with a left-hand bracket and cursor at the bottom left of the screen.

c. Take the disk out of Drive #1. It has your new file on it. LABEL IT CORRECTLY NOW.

d. Put pfs File in drive #1, type PR#6, press RETURN (you are rebooting the program).

e. When the light is out and the main menu showing, put pfs away, put the new disk is drive one, (the disk in drive #2 is just garbage, use for a later file). You are ready to go.

pfs Report

This program enhances the commands available in pfs File. In order to use it, you need a data disk developed with pfs File, an Apple II, a printer and two disk drives. If you have only one disk drive you cannot use the SORT commands. Without being able to do sorts, the program will be of limited value.

If you have a new pfs Report disk, you may have a Sortwork disk included in the package. If you do not, you will need to create a SORTWORK disk. To do this load pfs File, then put a new disk in drive #1. (If you only have one disk drive, you cannot use the Sortwork program so don't worry about copying it.) Select #1 DESIGN, use SORTWORK as the file name, when you are presented with the design page (blank screen), simply type : and press CTRL/C. When the whirring has stopped, take the disk out of the drive, label it SORTWORK and continue to read this manual.

The purpose of the Report program is to turn your database into a report with up to 9 columns. Three of those columns can be created by mathematical manipulations of the data. Sorting (alphabetic and numeric) can be done in the first two columns and counts, totals, averages (and subcounts, subtotals and subaverages) can be calculated for any column. Very impressive.

Getting Started:

Assuming you have data on a disk which was created using pfs File, load pfs Report in drive #1. Remember that the label should be facing up and at the front, close the disk drive door, turn on the computer (or if you have been in pfs File, put pfs Report in drive #1 and press RESET). When the program has loaded (disk drive light out, writing on the monitor) take the pfs Report disk out and put away safely. Put your data disk in Drive #1 and the Sortwork disk in Drive #2. (If you do not have a second drive, you cannot use the Sortwork disk.) Since you are probably going to do some printing, make sure the printer is on, the paper feeding properly and the ON LINE, or comparable, light is on.

You should now be looking at a screen with 3 choices (this will be called the Main Menu), there should be disks in both drives and the disk drive doors should be closed. Note: when you are finished, return to this Main Menu first (press ESC). If you do not, you may RUIN YOUR FILES.

1. PRINT REPORT

This is the main program, type 1. If you remember the file name you can type it in; if you do not, you can leave it blank and the computer will load the file in drive #1. Press CTRL/C. (If you make a typing mistake, use the left-hand arrow <-- and type over or use the spacebar to type blanks.)

b. You should now be facing the template for your database (a blank form). At the bottom of the screen will be

RETRIEVE SPEC

If you want to select certain forms for this report, now is your chance to do so. Use the same search strategy you would use in pfs File SEARCH. (If you can't remember, return to the File section of this manual.) Keep in mind that this is a SEARCH STRATEGY (i.e. designed to eliminate or select certain records) it is NOT a SORT STRATEGY (i.e. designed to sequence forms.) For your first experiments, don't worry about Search Specifications, simply press CTRL/C and continue.

c. You now are asked to specify Report Options.

Type in a TITLE (up to 32 characters and spaces, it will be centered at the top of the page)

If you had already saved a report form, you could now retrieve it. Since you don't have one yet, leave PREDEFINED REPORT FORM blank

If you want a printed report, you can select P or L for OUTPUT. If you needed L before to print out information, use it here (Epsons need L.) The worse that can happen by specifying P, is that your report will all be typed on one line, which is not easy to read, and you will have to go through this process again selecting L. (If you select L when you don't need it, your report will be double spaced.)

If you only want information on the monitor, select D (D=display) . Right now, you should select D.

Page and line width is standardly 80 columns and 66 lines. If you want a different print-out, change it. If you are just using the monitor, the length will automatically be the length of the screen and you can move across the 80 column screen with CTRL/A (for alternate screens). For now, change the page width to 40 so that you can see everything.

When you are finished, press CTRL/C.

d. Back to a blank form, but this time REPORT SPEC is at the bottom on the screen. Now comes the fun.

To indicate where you want the information to appear on the report, place the number of the column next to the item. You have a maximum of 9 columns available. Keep in mind the number of spaces available to you across the page (or across the monitor.) There are some strategies for shortening titles to help conserve

space, but for now just keep the problem in mind. If you make your report too wide, you will be told that only when the report is all complete and trying to run.

Sort: Sorting is only done in columns 1 and 2. Sorting is slow, so if you don't want any sorting done, label the first column 3 (if there is no 1 or 2, #3 will be at the left margin.) If you only want one item sorted, label the columns 1,3,4,etc. Sorting can be done:

numerically (highest number will be first), use both a 1 to indicate you want a the sort in the first column and an N to indicate a numeric sort.

alphabetically (first letter of alphabet will be first, or if it is number treated alphabetically the lowest number will be first (starting with the number in the left-hand column.)

Subtotals, subaverages and subcounts are done for the subdivisions created in column 1 only.

In the sorting process, you can type a number of commands next to the column number. These include:

T numeric total for the column

ST numeric subtotal (using the divisions established in column 1) and grand total

A numeric average for the column (When using this remember that 0 is averaged in and a blank is not. Make sure your data is consistent.)

SA same logic as ST

C count of each new entry

CN numeric count of entries (this command will also format the numbers in that column right justified and with 2 decimal places.)

CS same logic as ST

P will start a new page every time the entry in column #1 changes

K Keyword sort. This is especially useful in bibiographic databases. Each form appears listed under each keyword. To set up a keyword item, list the keywords with a space (only a space, no comma) between them. Use in column 1.

If you want to exclude certain forms from the report, remember that you do that in an earlier step in this process (on the Retrieve Spec screen.)

e. In addition to the columns you can pull directly from the forms, you can also create three additional columns of numeric information from your numeric data. (The total number of columns is still 9.)

When you have finished defining the columns you want from the form, press CTRL/D (D=derived columns). First you will be asked to type the heading (if you leave this blank the formula you use will be put in as the heading.)

Then you will be asked to type out the formula. To do this you will need to refer to the column numbers. For example, if this column is to be the total of columns 4 and 5, type #4 + #5. (If you can't remember the column numbers, press CTRL/D to return to the form. Another CTRL/D will return you to the derived column formats. In designing your formula, you need to know that the formula will be evaluated from left to right. You can use two levels of parentheses to change this sequence. You can have three columns of derived formulas, however, the derived formula columns are going to be evaluated from left to right so any column that uses a derived value of another column must be to the right of it (got that?) If you think about some little computer gnome heading across the row doing the work, the reason for this will be somewhat more obvious.

Finally, you are asked for Report Spec, what column the results of the calculations should be in, whether you want totals, average, count, subtotals, etc. Use the same code that you used on the form. When you are through, press CTRL/C.

Possible problems:

Report too wide: ask for a truncated version for the time being. If the problem is the length of the column titles, you can change those (see below). If the problem in the information itself, revise your report.

Sort too long (too much memory required to keep track of both sort columns. Revise your report, maybe not using column 2.

** where numbers should be. Numbers are too big (even one number that is too big will cause this problem.) Too big=more than 20 digits. The problem is probably on the right-hand side of the decimal point. Revise your formula.

I/O error: (I=input, O=output i.e. there is problem with reading a disk.) This may simply mean the disk drive door was not closed, but it may mean disk problems. The chances are high that an I/O error means that data has been damaged. Change to your back-up disk and make a new back-up disk.

2. PREDEFINE REPORT.

You can define and save 8 report forms for each data disk. Type #2, then press CTRL/C. Use exactly the same commands listed above for Report Spec.

If you should want to change or erase a predefined report form, type 2 and the name of the file. You will have the format in front of you.

> To make minor changes, add new information, erase old information by typing over or using the spacebar.
>
> To make major changes, type CTRL/E which will erase the information on the form, but not erase the filename.
>
> To erase the report form completely, type CTRL/R (You will be given a second chance.)

If you can't remember the name of a predefined report form, select #2 from the main menu, the files will be listed; press ESC to return to the main menu.

3. CHANGE HEADINGS

As mentioned earlier, this is an easy way to reduce the column size (when the item name is wider than the information in the column.) It can also be used to make the report more understandable.

The disadvantage of this command is that it overrides whatever you stored in your predefined reports! There does not seem to be any way to avoid this. Therefore, you will probably want to use this sparingly and remember to erase the changes if you don't want them on other reports.

Type #3, file name (or leave blank) and CTRL/C.

With the blank format in front of you, type in the changes next to the item name. When you are finished, press CTRL/C.

To make changes later, type #3, retype, or use the spacebar to erase or type CTRL/R to remove all headings.

BE SURE TO LEAVE THIS PROGRAM BY RETURNING TO THE MAIN MENU (press ESC). Otherwise you may mess up information in your files. You can then leave pfs Report by putting the disk you want to work on in drive one and pressing RESET, or you can turn off the computer. PUT ALL DISKS AWAY CAREFULLY.

(Congratulations!)

DIALOG

It is easier to let DIALOG speak for itself. The rest of this manual is reproduced from their introduction to the system. There are certainly some costs associated with using DIALOG. You need to attend a two day training session (offered all over the country) and to order a basic library of information (total cost of about $300). You must be able to access the DIALOG computer in California with a terminal or microcomputer and modem. Each search will cost approximately $40.

For many of us in the nonprofit world, this seems expensive. It is unless you are spending staff time trying to find out what is happening in research or who is getting the money (there are three grants indices). At least consider the option of using DIALOG or one of the many other commerical databanks available to you before you spend staff time creating a small, less powerful version of these databanks for yourself.

Database (File Number(s))
Dates of Coverage

CHEMISTRY

CA SEARCH (308, 309, 310, 311, 320)
1967–present
CHEMICAL INDUSTRY NOTES (19)
1974–present
CHEMICAL REGULATIONS AND GUIDELINES SYSTEM (174)
Current
CHEMNAME (301)
1967–present
CHEMSEARCH (30)
Current
CHEMSIS (328, 329, 330, 331)
1967–present
★PAPERCHEM (240)
7/68–present
TSCA INITIAL INVENTORY (52)
1979 edition
RAPRA ABSTRACTS (95)
1972–present

AGRICULTURE AND NUTRITION

AGRICOLA (10, 110)
1970–present
BIOSIS PREVIEWS (5, 55)
1969–present
CAB ABSTRACTS (50)
1973–present
CRIS/USDA (60)
Current
FOOD SCIENCE AND TECHNOLOGY ABSTRACTS (51)
1969–present
FOODS ADLIBRA (79)
1974–present

MEDICINE AND BIOSCIENCES

BIOSIS PREVIEWS (5, 55)
1969–present
CA SEARCH (308, 309, 310, 311, 320)
1967–present
CHEMNAME (301)
1967–present
CHEMSEARCH (30)
Current
CHEMSIS (328, 329, 330, 331)
1967–present
EXCERPTA MEDICA (72, 73, 172)
6/74–present
HEALTH PLANNING AND ADMINISTRATION (151)
1975–present
INTERNATIONAL PHARMACEUTICAL ABSTRACTS (74)
1970–present
LIFE SCIENCES COLLECTION (76)
1978–present
MEDLINE (152, 153, 154)
1966–present
★MENTAL HEALTH ABSTRACTS (86)
1969–present
PHARMACEUTICAL NEWS INDEX (42)
1975–present

ENERGY AND ENVIRONMENT

APTIC (45)
1966–9/78
AQUACULTURE (112)
1970–present
AQUALINE (116)
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